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A RAND NOTE

**Conventional Arms Control Revisited:
Objectives in the New Phase**

James A. Thomson, Nanette C. Gantz

December 1987

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➤ Conventional arms control policy ought to be closely coordinated with defense policy, but the Western allies have been unable to do so. Linkage is difficult because of the institutional differences between force planners on the one hand, and arms controllers on the other. Aggravating the problem is the lack of a unifying framework by which outcomes in both areas can be assessed. The authors outline a three-step process for designing a unified concept for defense and arms control planning, describe the long-term coordination of the process, and identify principles that should guide NATO's conventional arms control planning.

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PREFACE

Project AIR FORCE is conducting a study on alternative proposals for the new phase of conventional arms control that is likely to occur in the Atlantic-to-the-Urals context. This Note, part of the study, discusses one of the major issues that the United States and its Allies face in this new phase—what should be the overall objective of the Western proposal.

The concepts and results outlined in the Note will be discussed in more detail in the final project report.

ACKNOWLEDGMENTS

This Note, like many research reports, rests on work that was not done by the authors alone. In this case, we are especially indebted to Laurinda Rohn and Robert Howe; they performed the many calculations upon which much of this Note rests.

CONTENTS

PREFACE	iii
ACKNOWLEDGMENTS	v
FIGURES	ix
Section	
I. INTRODUCTION	1
II. AN OVERALL CONCEPT	3
The Overall Objective: A Stalwart Conventional Defense	3
Assessing the Balance	4
NATO's Defense Improvement Goals	7
III. COORDINATION OF DEFENSE AND ARMS CONTROL PLANNING	10
IV. CONCLUSIONS	16

FIGURES

1. NATO-Warsaw Pact Force Comparisons	5
2. Dynamic Measure of Conventional Balance	7
3. Increased NATO Capabilities	8
4. Reduced Pact Capabilities	11
5. Mutual Asymmetrical Reductions	11
6. Need for High Reduction Asymmetries	13

I. INTRODUCTION

After years in obscurity, conventional arms control is moving toward the forefront of the security debate in the Atlantic Alliance. The long moribund talks on Mutual and Balanced Force Reductions (MBFR) will probably soon be replaced by new negotiations on conventional stability in the region from the Atlantic to the Urals. This change of forum coincides with new political interest in conventional arms control, stemming in large measure from the debate over nuclear weapons and NATO strategy. The superpower agreement to the so-called "double-zero solution" for Intermediate Range Nuclear Forces (INF) helped spur this new-found interest. With the deterrent value of nuclear weapons seemingly on the wane, politicians and analysts alike are looking toward NATO's conventional forces to provide an increased increment to deterrence. By the same token, many Western politicians see conventional arms control as a means to help solve NATO's conventional defense problems. In other words, they are looking to conventional defense and arms control policy to work together.

Conventional arms control policy ought to be closely coordinated with defense policy. Both efforts contribute toward meeting a key Western objective of improving the conventional balance in Western Europe, but each by different means—the latter by increasing NATO capabilities and the former by lessening requirements through the reduction of Warsaw Pact forces. Nevertheless, the West has been plagued by its inability to connect its conventional arms control policy clearly to conventional defense policy. In part, linkage is difficult because of the institutional differences between force planners on the one hand and arms controllers on the other. An additional contributing factor has to do with the lack of a unifying framework by which outcomes in both areas can be assessed.

NATO continually pursues both an arms control policy and a force improvement program, but only rhetorically attempts to link the two policies. Public statements pay lip service to the need to coordinate the policies, but in reality the two proceed on separate tracks. For example, in the 1970s, the West pursued its arms control policy at the MBFR talks in Vienna. The nominal goal was to achieve equal manpower levels in the NATO Guidelines Area (NGA).¹ Considerable reductions, including equipment, were initially envisioned, but the emphasis gradually shifted toward small reductions in U.S. and Soviet

¹The NGA includes Belgium, Luxembourg, The Netherlands, West Germany, East Germany, Poland, and Czechoslovakia.

manpower, with the hope that larger cuts in NATO and Warsaw Pact ground forces would follow, leading to parity between the two sides in ground and air force manpower. NATO's force improvement initiatives converged with the adoption of the Long-Term Defense Program (LTDP) in 1978. The LTDP did not focus on manpower as NATO's major deficiency, nor did it set parity as its goal. Instead, NATO used more complex assessments of the force balance to identify deficiencies and the necessary improvements. Western leaders made few attempts to explain how the arms control and force improvements worked together to reduce or eliminate the conventional "imbalance" beyond the platitude that NATO seeks to redress its conventional inferiority through arms control and force improvements.²

The new conventional force negotiations may provide NATO with the opportunity to improve the coherence of its defense and arms control policy. In formulating a negotiating position, NATO will be confronted with many challenges derived from the ability to redress some of the problems in the MBFR approach and from the larger Atlantic-to-the-Urals zone.³ NATO could also use this period of reevaluation to bring Western arms control and defense efforts under a single unified concept.

²In the late 1970s, James Blaker, the SecDef Representative on the U.S. MBFR Delegation, did attempt to forge a link between the LTDP and MBFR. But few generally accepted it outside of OSD; and, in any event, it foundered because of the difficulty of connecting the two originally unconnected policies.

³NATO will have to revisit several key arms control issues that, for good or bad, were resolved under MBFR. Manpower, as the unit of account in MBFR, proved to be an inadequate measure of combat capability and a verification nightmare. Similarly, the narrow NGA zone had serious geographic asymmetries unfavorable to NATO. New negotiations would clear the slate of these disadvantageous MBFR positions on unit of account and geographical scope of limitations, but also would require NATO to find a better way to address these difficult issues.

II. AN OVERALL CONCEPT

Ideally, the design of a single overall concept for both defense and arms control planning can be a three-step process: First, an overall defense objective should be stated. Second, the current balance of forces could be assessed to see how far NATO is from the desired objective. Third, steps needed to eliminate the gap could be proposed, in both the defense and arms control fields.

The balance (or imbalance) of conventional forces in Central Europe inevitably lies at the heart of an overall framework, since Central Europe is the focus of NATO conventional defense planning. The imbalance of conventional forces there is seen as the chief potential source of military instability in Europe (if not on the globe) and drives other requirements, including NATO nuclear strategy and force needs.

The assessment of the balance provides a baseline for estimating the added capabilities needed to meet the overall planning objective. The gap between the objective and the current balance could thus be eliminated by a program of action—defense programs, arms control proposals, and combinations of the two. Although this may seem straightforward, in fact the process is fraught with political and analytic difficulties. Such a process would help unify defense and arms control planning. In fact, defense planning itself could be improved if there were a clearer statement of its objective. NATO defense planners have difficulty articulating the goal of conventional defense improvement efforts, usually falling back on bromides: "improving the balance," "reducing reliance on nuclear weapons," or even "keeping pace with the Warsaw Pact build-up." Arms control objectives have been similarly vague.

THE OVERALL OBJECTIVE: A STALWART CONVENTIONAL DEFENSE

Clearly, NATO's chief objective is to deter Warsaw Pact aggression—for our purposes, aggression with conventional forces. But the exact conventional capability needed for deterrence is a matter of judgment and debate, especially since the Alliance also relies on its nuclear forces to provide deterrence of conventional attack. Some might be satisfied with fairly weak conventional capability that would have little chance of preventing the Pact from overrunning West Germany completely, on the grounds that fear of nuclear escalation would prevent the Soviets from any military engagement with the West. Others might argue that because of the Soviet achievement of nuclear parity with the United States, the West ought

to be able to fight and win a long conventional war with the Pact, possessing the capability of protecting NATO territory and even of seizing some Warsaw Pact territory in the event of Pact aggression. Clearly, these two extremes illustrate the political difficulties in setting an explicit objective.

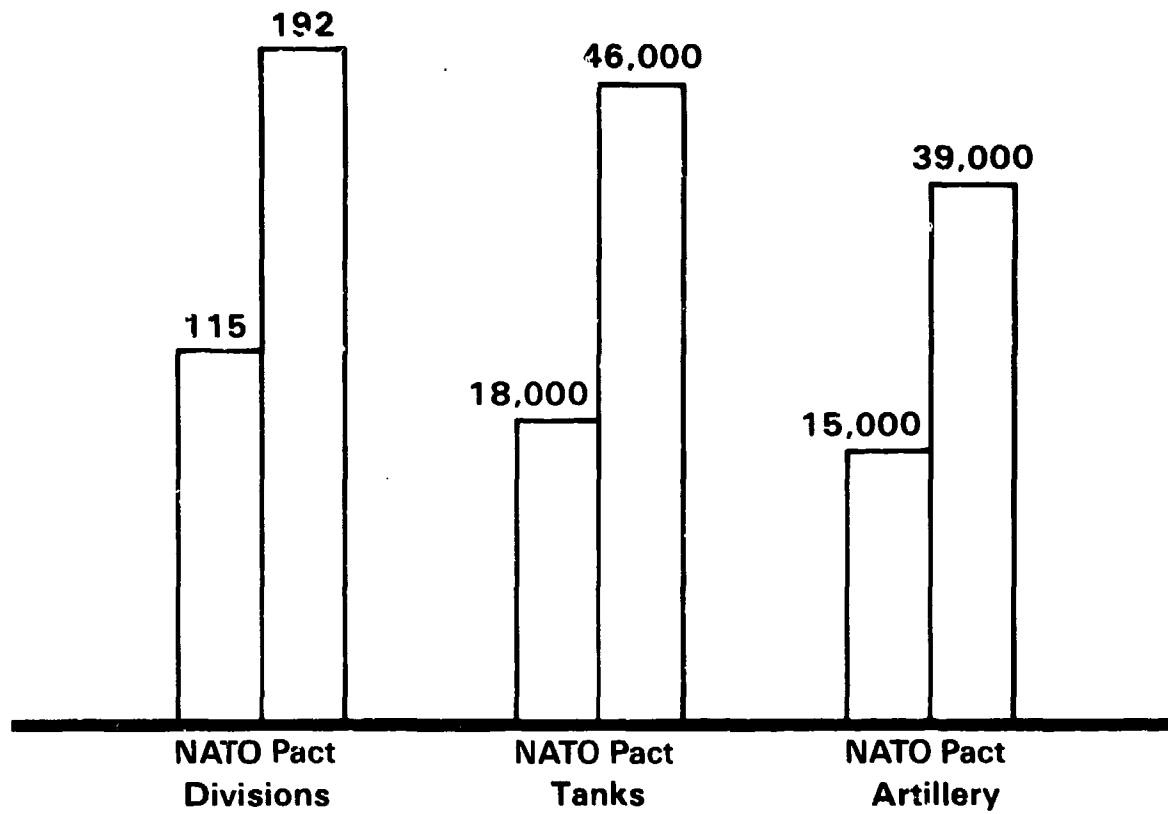
For our purposes, we have not sought to settle this argument. We have instead stipulated an objective of a "stalwart conventional defense" capability: a balance in which NATO forces would prevent a substantial Warsaw Pact advance into West German territory under a wide range of assumptions and scenarios. This goal is consistent with the forward defense strategy contained in MC 14/3. It also has the virtue of being less politically controversial than the extremes—neither to allow substantial loss of German territory in a conventional conflict nor to seek a military victory based on offensive action. If the Alliance could halt a Warsaw Pact advance in the forward area and hold it there for 30 days, this ought to provide a strong conventional component to NATO's overall deterrent.

ASSESSING THE BALANCE

Most defense analysts and officials would agree that NATO does not currently possess sufficient capabilities to meet this objective because of the largely unfavorable conventional force imbalance in Central Europe. Popular portrayals of the imbalance are based on "bean counts": a racking up of the number of manpower, divisions, tactical aircraft, tanks, artillery, armored personnel carriers, etc. on the two sides. One such assessment is portrayed in Fig. 1. Such assessments are quite useful because the numbers are one indicator of conventional capabilities, the approach is easy to understand, and the totals do indicate an imbalance. These advantages assist governments in explaining the Warsaw Pact threat to the public and provide a currency for both arms control and defense planning efforts, especially the former.

However, because neither NATO nor the United States seeks to match the Warsaw Pact numerically, conventional defense planning does not relate directly to bean counts. Furthermore, the objective of a stalwart conventional defense is defined in terms of the outcome of a military engagement. Clearly, assessment of the conventional balance must take into account more than the bean counts.

To overcome one of the deficiencies of bean counts, analysts often use scoring schemes to account for the quantity and quality of weapon systems. A score is assigned to each weapon to account for its quality, usually its firepower, mobility, and survivability. Such schemes aggregate the numbers and scores of the individual ground force weapons and score each division in terms of equivalent divisions (EDs), in which a U.S. armored division,



Source: NATO Information Service, 1984

Fig. 1—NATO-Warsaw Pact Force Comparisons

scored as 1, is the standard against which to compare other countries' divisions and other ground force units. Most other NATO and Pact divisions tend to score less than 1 ED. Also, NATO divisions are generally stronger than Pact divisions; thus, for forces deployed in the NGA in peacetime, the ratio of actual divisions is about 2:1, the ED ratio is about 1.6:1.

Although they are an improvement on bean counts, the ED figures still have many disadvantages. They do not account for air forces, personnel qualities, alternative scenarios for conflict, the terrain, the advantages to the offense and the defense, the nature of potential engagements at the operational and tactical level, supplies and support structures, etc. And, like the bean counts, they cannot be directly related to the military operational objective of stalwart conventional defense.

For this purpose, analysts use theater-level air-ground combat simulations, which provide a better—but still far from perfect—representation of the balance. Such simulations enable analysts to measure the balance in terms directly relevant to the stalwart conventional defense goal. For example, the balance can be depicted in terms of territory lost by NATO forces—average forward edge of the battle area (FEBA) position—in a conflict; and the stalwart conventional defense objective might be defined as holding Pact forces inside the NATO main battle area (roughly 20-40 km) for forward defense.

A computer simulation of the central front battle can account for many of the variables mentioned earlier, which is the strength of simulations. It is also their weakness, because the many input data and assumptions may make it more difficult to see what caused the results. Nevertheless, modern theater-level combat simulations are the best tool currently available for assessing the balance.

Perhaps the most important assumptions are contained in the mobilization scenarios, specifically the forces available for conflict and the time required to make them available. For example, the threat to Central Europe can be defined as the Warsaw Pact forces currently deployed in the NGA, plus those in the adjacent areas of the Western USSR, a total of 110-120 Warsaw Pact divisions. To meet this threat, NATO has forces currently deployed in the NGA, France, and the UK, together with reinforcements deployed from the United States. Because the dominant NATO defense and arms control problem is commonly believed to be the short warning scenario, the results outlined here are based on a 5/10 scenario: 10 days of mobilization time for the Warsaw Pact and five days for NATO. Neither NATO nor Warsaw Pact forces benefited from "premobilization" training of troops to improve readiness. At the start of the conflict NATO forces had moved to their forward defense positions, but reinforcements from the United States had not yet started to arrive. We examined other scenarios; this one is representative of a range of possible scenarios. Figure 2 depicts the outcome of the simulation for this scenario, displaying the average FEBA in terms of days of conflict.¹ In this example, NATO loses roughly 100 km on the average in 30 days.

¹This Note used the combat simulation "CAMPAIGN," developed as part of the RAND Strategy Assessment System (RSAS).

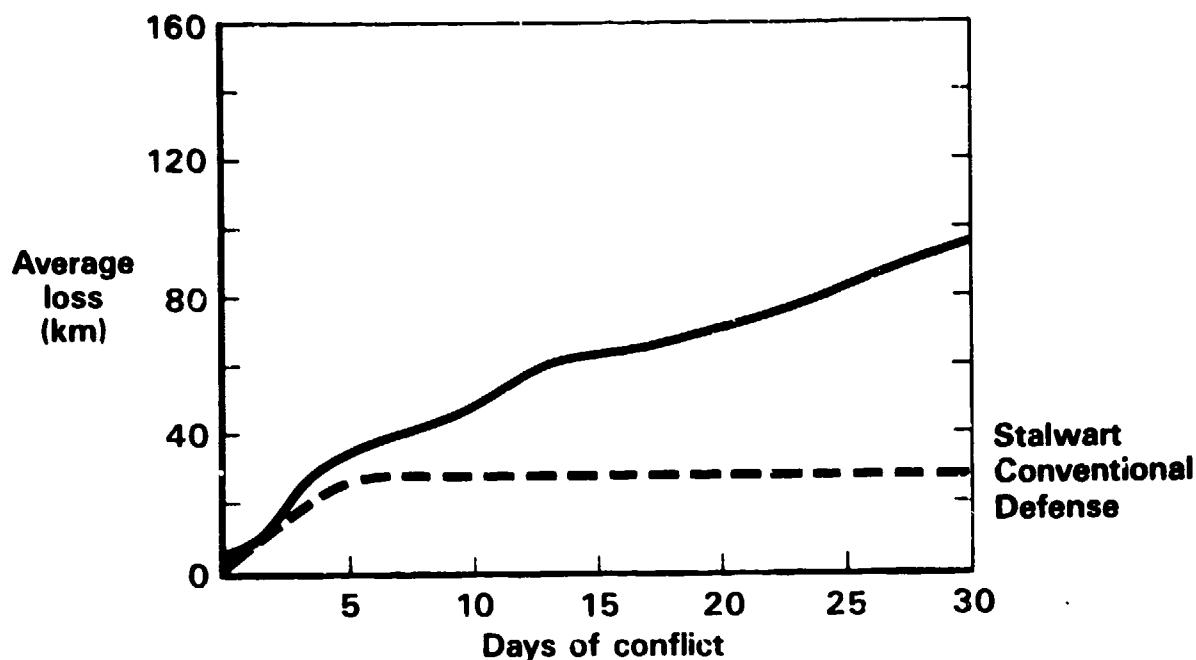


Fig 2—Dynamic Measure of Conventional Balance

NATO'S DEFENSE IMPROVEMENT GOALS

Defining the additional capabilities to obtain a stalwart conventional defense can also be done through the simulation methodology. NATO would need enough additional capability to hold the Pact forces in the forward area, depicted in Fig. 2 as the stalwart conventional defense line.² Figure 3 helps to illustrate this point. For the lower curve, we begin on the vertical axis at the roughly 100 km average FEBA loss in 30 days, which depicts the current balance. As NATO adds capabilities (denoted on the horizontal axis as additional EDs), its conventional forces are better able to forestall a Warsaw Pact attack and thus do better at the end of a 30-day conflict. In the lower curve, the introduction of roughly five EDs has met the stalwart conventional defense objective.

Naturally, this is an uncertain estimate. One of the most important uncertainties involves the assumptions concerning the NATO and Warsaw Pact mobilizations. The upper curve in Fig. 3 represents estimates made with more pessimistic assumptions concerning mobilization.³ It indicates that NATO would need about eight EDs to reach a stalwart

²This line was chosen at roughly 30 km. The specific choice within the 20-40 km range discussed earlier is somewhat arbitrary.

³This estimate also used a 10/5 scenario but assumed that the Soviet force readiness in the Western USSR was secretly improved before mobilization. In the scenario, either NATO did not detect these preparations or failed to act upon detecting them.

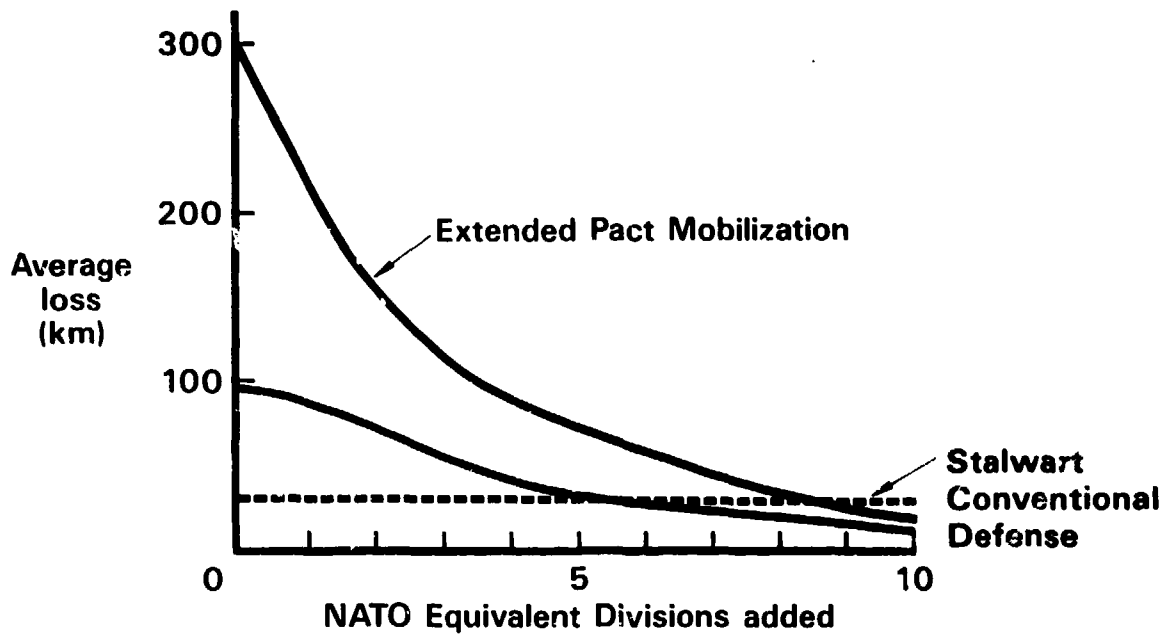


Fig. 3—Increased NATO Capabilities

conventional defense. Another important assumption concerns the availability to NATO of French forces. The estimates above assumed French forces were available; if not, NATO would need five more EDs. The exact choice of the stalwart conventional defense line provides an additional uncertainty. Given the various uncertainties, ten EDs would be a good mid-point estimate for additional NATO capabilities needed to reach a stalwart conventional defense objective. The ten EDs can be more generally thought of as a requirement for both force planning and arms control.

The new capabilities need not all be divisions per se. In the estimates mentioned above, "divisions" should be thought of as a surrogate for increased capabilities in general, which could consist of (1) greater ground force structure—e.g., brigades or divisions; (2) further tactical air force structure; and (3) improvements to existing forces—not simply modernization to keep pace with technology and the threat, but qualitatively new capabilities on NATO's side that Pact developments could not easily counter. This last category might include new interdiction capabilities as called for by the NATO Follow-On Force Attack (FOFA) concept, better use of forward barriers, etc.

Furthermore, although the analysis usually posits that the additional ten "divisions" are in place during peacetime, this need not be the case. In this analysis of the central front battle, NATO holds some existing forces in operational reserve early. Because the additional ten "divisions" would strengthen this operational reserve, some of these capabilities would not be required for one or two weeks. Roughly half of the additional "divisions" should represent in-place capabilities, and half would need to be available within a couple of weeks, either through the mobilization of European forces or by reinforcements from the United States.

A determination of exactly how these increments of new capability should be formulated requires a detailed analysis that factors in resource constraints, combined arms considerations, etc. This detailed analysis could result in a comprehensive defense program for NATO, from which national requirements could be defined. That said, obvious political and analytical difficulties would abound in obtaining U.S. (let alone NATO) agreement to either an overall requirement or appropriate force mix. Political difficulties would stem from, among other things, Allied nations' probable refusal to agree to defense requirements that they are unwilling or unable to meet, as well as from concerns that achievement of such capabilities could lead to a revision of Alliance nuclear strategy (e.g., no first use). Analytic difficulties stem from the numerous assumptions that underpin these assessments. Indeed, it would probably be easier to agree on the statement of requirements than on the analytic details.

III. COORDINATION OF DEFENSE AND ARMS CONTROL PLANNING

If NATO could agree on the overall requirements and the increments of capability needed to achieve it, as illustrated above, it would then be in a position to draft a multi-year plan aimed at obtaining them, taking account of fiscal and other resource constraints. Given the magnitude of the constraints, the plan would have to span many years.

NATO could explore the possibility of reducing some of its requirements through conventional arms control. At one extreme, one might posit an arms control outcome that would completely eliminate the need for any additional NATO capabilities through unilateral Warsaw Pact reductions. The size of such reductions can also be estimated through combat simulations, as described earlier. For example, Fig. 4 indicates that NATO would achieve a stalwart conventional defense capability if the Warsaw Pact eliminated 20 EDs from Eastern Europe and the Western USSR. (In fact, the actual number of divisions eliminated would probably be between 25 and 30, since Soviet divisions are typically about 0.8 ED and non-Soviet are weaker still.) The flatness of the curve during initial reductions indicates that any improvement in the balance demands substantial cuts (five to ten EDs) and a stalwart defense requires larger reductions (20 EDs). The upper curve indicates the sensitivity of this estimate to WP mobilization assumptions.

The relative value of just a few additional NATO EDs (two to three) compared with substantial Pact ED reductions (10 to 15) to have a similar effect indicates the considerable "excess" operational reserve capability that the Warsaw Pact has for offensive action and the paucity of such reserves for NATO to offset such action.

The more probable arms control approach would involve mutual NATO and Pact reductions. Figure 5 illustrates the effect of the size and ratio of NATO and Warsaw Pact reductions from Central Europe on the balance.¹

Equal Pact and NATO reductions (a 1:1 ratio in EDs) are obviously the wrong way to proceed. Somewhat more surprising is the 3:1 curve. Although quite asymmetrical, these reductions have little effect on the balance, *until* NATO reductions reach about three EDs.

¹In these estimates, forces are reduced primarily in the NGA region. For the purpose of this assessment, the actual location of the Pact reductions is not crucial—with ten days of mobilization, the Pact can bring almost all forces to bear in Central Europe in the course of the mobilization and the subsequent 30-day conflict. Reduced U.S. and Soviet forces remain on active duty in the CONUS and beyond the Urals, respectively, to which they return. East and West European forces are demobilized.

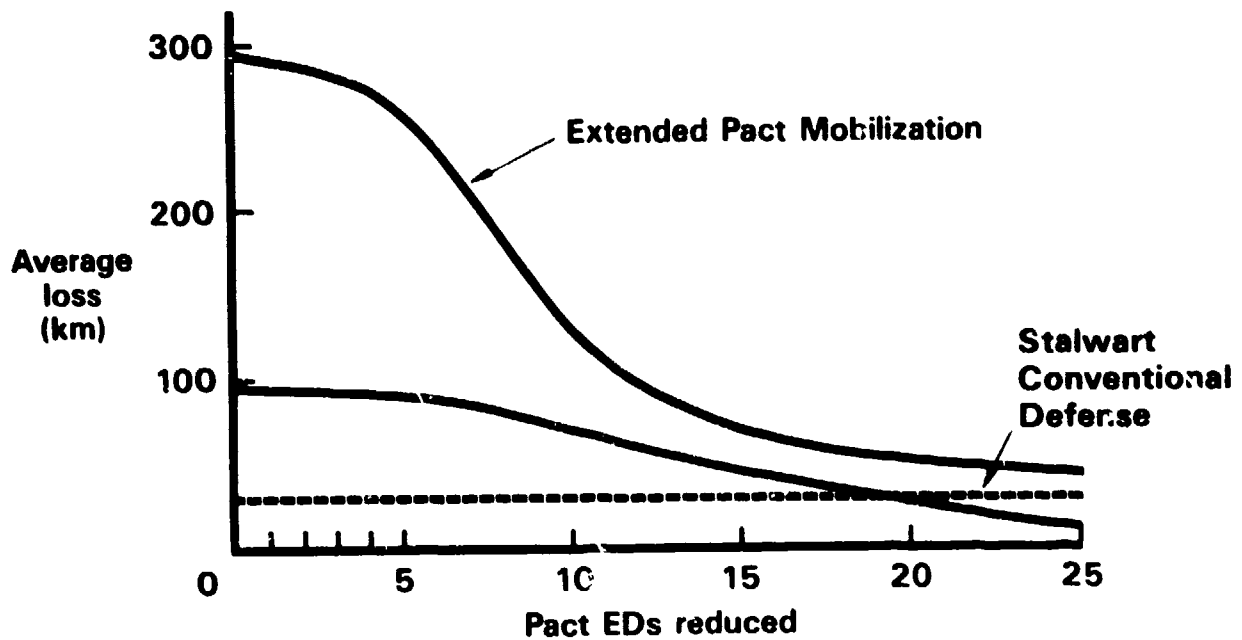


Fig. 4—Reduced Pact Capabilities

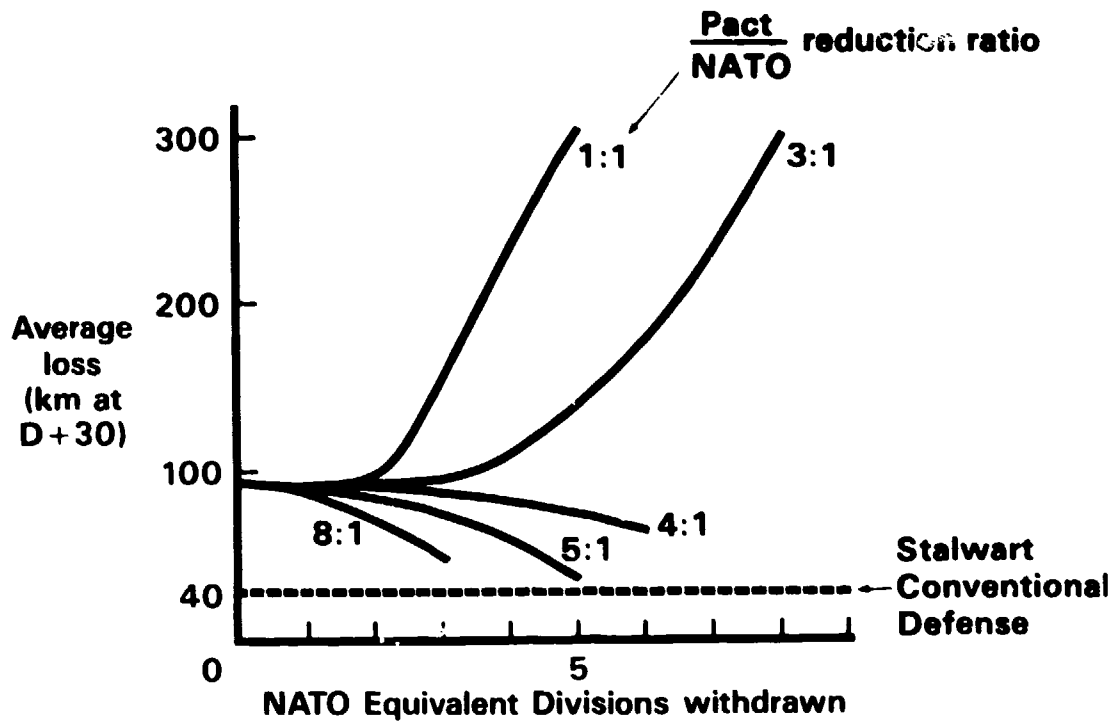


Fig. 5—Mutual Asymmetrical Reductions

From that point on, the balance turns rapidly against NATO. NATO forces have become too weak to provide an adequate force-to-space density over the front and to mount a coherent defense against even a weakened Warsaw Pact attack. To overcome this effect, more asymmetric cuts are needed—at least 4:1 and probably higher. Highly asymmetric reductions (e.g., 8:1) improve the balance substantially.

These curves illustrate several other important points. "Small" cuts, even if highly asymmetric, do not appreciably affect the balance. Much larger cuts are needed. Looking at the 5:1 curve, for example, NATO might choose an arms control proposal of four EDs traded for 20 Pact EDs. This would have a measurable improvement on the balance, but falling back halfway—to 2 and 10—would negate much of this improvement.

The curves also indicate a rapid change in the outcome between 3:1 and 4 or 5:1. This steep gradient can be partly understood without the details of combat simulation. As noted above, a key component of the balance is the potential availability of operational reserves to the two sides: The Pact uses them to create and exploit breakthroughs in NATO's forward defenses; NATO stems breakthroughs. This ratio is a good measure of the balance. Figures 3 and 4 indicate that this ratio must be fairly large. Small increases in NATO capabilities improve the balance substantially. Larger decreases in Pact capabilities make little difference. Figure 5 indicates that the equal-effect ratio might be around 4:1. With such a ratio, reductions of 3:1 would cause a sharp deterioration of the balance as NATO cuts increase. But a 5:1 reduction ratio will cause it to improve. Hence, a steep gradient.

The need for highly asymmetric cuts to improve the balance can also be partly understood without the combat simulation. This is demonstrated by Fig. 6, in which the Pact forces that are ultimately brought to bear in the conflict outnumber NATO's by slightly more than 2:1. But both sides have a need for sufficient forces to cover the front with a coherent defense. Various rules of thumb, such as 25 km per division, can be used to estimate this minimum required force; in Fig. 6, 22 EDs are used for illustration.² When these are removed from the picture, the ratio of "excess" forces is roughly 4:1. Hence, the equal-effect reduction ratio would be 4:1. The picture is actually more complex, which is why we must use a simulation, but this simple ratio model helps illuminate the situation.

²In fact, this is the number that the CAMPAIGN model generated on the average—accounting for terrain, defense preparations, etc.

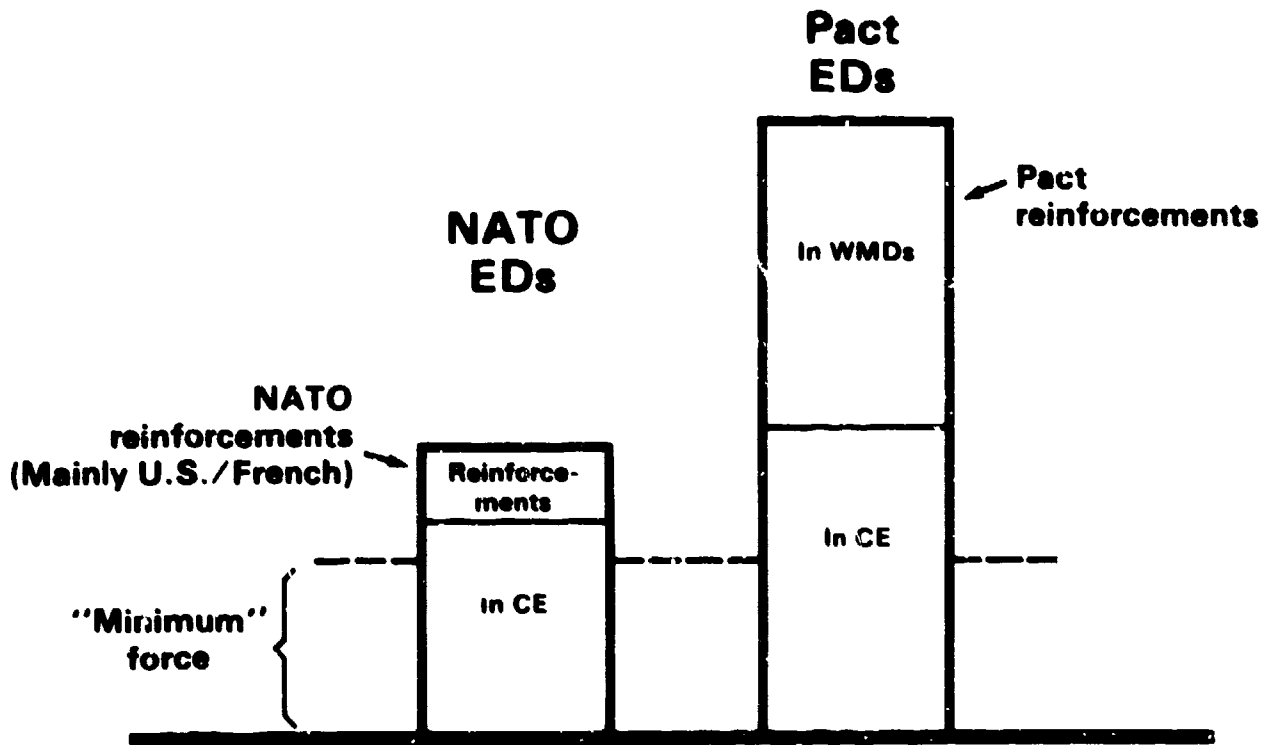


Fig. 6—Need for High Reduction Asymmetries

For a given reduction ratio, the exact shape of the curve in Fig. 5 will depend on many factors, the important ones of which include the mobilization scenario and the time for forces to return to the forward area. In particular, the specific location of the steep gradient is hard to predict. Sensitivity analysis indicates that it is in the region of 4:1, but prudence would dictate a reduction ratio at least in the region of 5:1.

Thus, Fig. 5 makes an important point about conventional arms control: To have a meaningful effect on the balance, mutual force reductions must be substantial in size, and the Pact/NATO reductions asymmetry must be large. Small reductions, even if highly asymmetrical, simply do not have much effect on the balance. The NATO reduction size should be in the region of three to four NATO EDs, implying a Pact reduction of at least 15 to 20 EDs; if a 5:1 ratio is chosen (in terms of real divisions, the reductions would be on the order of three to four NATO divisions for 18 to 24 Pact divisions).

Beyond the size and asymmetry of a proposal, NATO would also need to address the question of what forces to reduce and limit.³ Thus far, we have been discussing reductions primarily in terms of EDs, which is an analyst's term. EDs help capture the sense of combat capability, but for negotiations they would have to be translated into some kind of arms control currency such as formations, equipment, or manpower. NATO's objective in reductions should be to concentrate on those Warsaw Pact force elements critical to launch an offensive. Given this criterion, the obvious candidates for reductions are tanks (which allow Pact forces to seize territory) and artillery (for suppressing NATO's forward ground-based defenses). Tank reductions alone would still permit offensives by mechanized infantry supported by artillery. In terms of packaging a proposal, the size and asymmetry could be presented in such terms as an explicit ratio reduction (three to four NATO divisions for 18 to 24 Warsaw Pact divisions), or reductions to a common equipment ceiling on tanks and artillery (the ceiling could be derived from the same ratio). Obviously, reductions to equal ceilings would have greater public appeal than a pure ratio approach.

Negotiated reductions would certainly result in post-reduction force limitations. These limitations, essential to preserve the constraints achieved by the agreement and to discourage circumvention, would block some routes to increase NATO defense capabilities, as might be called for by defense planning. For example, Fig. 5 indicates that despite a force reduction of four NATO EDs and 20 Pact EDs, substantial defense requirements would remain. If the post-reduction limits were narrowly defined to restrict only the size of ground forces in Europe, NATO could meet the remaining defense requirements through increases in ground force structure in CONUS, in tacair structure in both CONUS and Europe, and in effectiveness of the forces. Of course, the limits could be even more narrowly defined to cover only those elements of ground force structure—tanks and artillery—that allow the Pact to launch offenses.⁴ However, accepting restrictions on both sides' tacair force structure in Europe would block another Western option to increase capabilities, thereby making the post-reduction defense planning job even more difficult (and even more dependent on increased capabilities of reinforcements from CONUS).

³Other questions not included here are how to divide the Atlantic-to-the-Urals zones for reductions and limitations and what should be the nationality of the forces reduced and limited.

⁴Although reductions by formations (i.e., divisions) would assist in verification, limitations on the number of divisions would seriously constrain NATO's ability to restructure its forces in a post-reductions environment.

The key point is that mutual force reductions probably cannot completely eliminate NATO's defense needs, they can only moderate them. Arms control can have some influence on the balance only if the reduction proposals are large and highly asymmetric. NATO would have to package such a proposal in some equitable way (i.e., common ceilings). The post-reduction limits associated with these proposals should emphasize one or a few force elements and should not block avenues for improving the effectiveness of existing NATO force structure. Phased reduction agreements may not be a good idea if the first agreement does not achieve deep cuts and also results in force limits. Even temporary force limits have a way of living on.

IV. CONCLUSIONS

To avoid pitfalls associated with incoherent defense and arms control policies, NATO should seek a common framework to guide policy in both areas. Ideally, this would include a clear objective, such as the stalwart conventional defense capability discussed here, and a long-term plan to achieve the targets. Arms control proposals could then be assessed in terms of the ability to reduce NATO requirements and permit the achievement of a suitably modified defense plan.

It may prove politically or analytically impossible to achieve this degree of coherence between conventional defense and arms control planning. Nevertheless, thinking about the problem in these terms reveals several important principles that ought to guide NATO conventional arms control planning:

- Arms control alone probably cannot meet NATO's conventional force requirements unless reductions are extremely deep and highly favorable to NATO.
- To have some effect, proposed reductions should be substantially asymmetrical, probably at least at a Pact/NATO ratio of 5:1 in overall combat capability. This would require division reduction ratios that are even higher. Smaller asymmetries are likely to leave the balance more precarious from NATO's standpoint.
- Even with large asymmetries, proposed reductions should be very large. Because the Warsaw Pact has a considerable force advantage, indeed an apparent "excess" of force, making a meaningful improvement of the balance requires large reductions. Hence, reductions of three to four NATO divisions in exchange for 18 to 24 Pact divisions would be necessary. Meeting this asymmetry would require NATO to develop some politically sensible proposal.
- Force reductions and post-reduction limits should emphasize those force elements that allow the Warsaw Pact to launch an offensive and create an unstable situation (such as tanks and artillery). Limitations should be narrowly defined so as to allow NATO maximum flexibility to meet its future defense requirements.

Following these principles will help ensure that arms control can work together with NATO defense improvement efforts to enhance NATO's conventional defense capabilities.